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ABSTRACT

The United States is transitioning to an information age society, requiring that the citizens and workers of the future be highly literate in their use of information. Information literacy is the ability to evaluate, analyze, and apply critical thinking to the use of information. Educators need to answer basic questions about how students become information literate using online resources and other technologies, which online resources best promote information literacy, and what strategies best prepare teachers to facilitate this learning. Performance assessment can provide a reflective process to inform these questions. The first step is to agree on a conceptual base. Assessment begins with the background each child brings to school and ends with competencies all high school graduates should possess. Performance-based tasks, longer projects or experiments, as well as student portfolios must be considered as assessment strategies; a progression of strategies that are developmentally appropriate for grades K-12, including group based projects as well as individual tasks can be developed. It is imperative that the assessment strategy specifically supports national initiatives. The development of information literacy assessment will involve teachers, administrators, subject area experts, students, and key project staff, all under the guidance of the Assessment Coordinator. The major steps in developing the performance assessment for information literacy are: defining the constructs to be measured; defining the target population; reviewing related tests; developing a prototype; evaluating the prototype; revising the tool(s); and collecting data on test validity and reliability. Professional development is critical to success; teachers are the key to the attainment of information literacy. (Contains 15 references.) (AEF)

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Performance Assessment for Information Literacy

A paper presented at
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by
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Abstract

The United States is transitioning to an information age society, requiring that the citizens and workers of the future be highly literate in their use of information. Information literacy is the ability to evaluate, analyze, and apply critical thinking to the use of information. Evaluation of information literacy is a construct that is being developed by default in practice. While grounding in practice is immediately practical, we also need to work for long term goals. We need to answer basic questions on how students become information literate using online resources and other technologies, what online resources best promote information literacy, and what strategies best prepare teachers to facilitate this learning. Performance assessment can provide a reflective process to inform these questions. Three major information literacy products need to be developed: (1.) the assessment tools, (2.) professional development models and training materials, and (3.) on-line information curriculum linked to school reform Frameworks and Standards. Assessment, as a formative activity, is a way to start. To do this, parts of traditional tests and measurements, other related but less central measures, such as those of critical thinking, and classroom-based assessment all need to be represented in the evaluation discussion. The purpose of this session is to provide rationale, discuss possible recommendations, and start a focused national dialogue on performance assessment for information literacy. Assessment tools for the construct of information literacy are absolutely necessary to establish credibility and to shape the development of practice in education.

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Performance Assessment for Information Literacy

> *School budgets depend on public support, and public support depends in part on public perception of school effectiveness.*
> John Hoven

Information literacy is the ability to access, evaluate, and use information from a variety of sources. Information literacy is best thought of as a verb, a way of doing information. The construct is not fulled developed but it is easy to see a conceptual sweep that includes basic skills in reading literacy, the mechanical skills of using technology, critical thinking, and problem solving. We, those advocating information literacy, are working on two basic questions.

- How does one become information literate?
- What practices work best in teaching and learning to be information literate?

Assessment is an important part of the process of answering these questions. The reasons are compelling:

Public and political stakeholders demand credible evidence;

Practice is shaped by assessment.

These two reasons are natural occurrences and affect all practices. The first reason, credible evidence, is a matter of perception, an admittedly constructed reality that has real consequences. That school budgets depend on the public's perception of effectiveness is obvious. That political decision makers depend on public weald is also obvious. This is more a natural law than a moral or philosophical position. The political pressure to make decisions based on standards and traditional appearing measurement is great and increasing. We must have credible evidence of outcomes.

The second reason has two forces shaping practice. One is the kind of decision teachers and employers make in selecting and continuing innovations. "Does this process offer a relative advantage?" Or, "Does it fit with existing practice?" In short, what is the advantage of teaching information literacy? The other force is external evaluation, the shaping of practice in response to standardized assessment -- a powerful determinant of practice. This paper is to encourage reflective and intentional development of assessment of information literacy in a milieu where assessment is unavoidable.

Assessment can have negative effects on the development of practice, stultifying the conceptual spread of an idea and making practice rigid. James Carey (1997) suggests procedures for measuring students' attainment of higher order-outcomes in information skills. Christina Bruce (1995) has reservations about measuring the phenomenological event of information literacy. Carey is rightly concerned about these skills and Bruce' reasons for avoiding standard measures is appealing. However, in practice decision makers' judgments of worth will be made regardless of philosophical position or intent.

The California experience with the CLAS assessment process demonstrates what happens when the public and political agendas are not addressed. The true challenge is providing appropriate assessment. Our worst examples of this are assessments of information literacy that end with finding information as the last step, not using information in real application. Information literacy is not an academic exercise.

The Secretary's Commission on Achieving Necessary Skills (SCANS) Report (1992) on employer needs in the workplace make the real world implications clear. Demonstrating economic consequences is only one subset of assessment but it is heavily weighted in public discourse. So, as tired as we may be of "real world" as a way of determining worth, it is a challenge we must not ignore. If we do, information literacy will be marginalized as an innovation.

Background

Information literacy in telecommunications is achieved when learners know when to use on-line resources, how to access information competently, how to evaluate information for accuracy and significance, and how to use this information to communicate effectively. Learners who are able to do this have a life long skill to meet the challenges of the information age.

The concept has been disseminated by the National Forum on Information Literacy , a coalition of over sixty national organizations from business, government, and education, all of which share an interest and concern with information literacy. It was organized as an outcome of the American Library Association's Presidential Commission in 1989, and has met quarterly since then to promote the concept of information literacy as imperative for the current Information Age. The purpose of this umbrella group is to disseminate the concept to other professions.

Information Literacy. Information literacy is a basic survival skill for the 21st century. It is not a "school" skill but one needed in all settings. It can be summarized as the ability to access, evaluate, and use information from a variety of sources. Significant advances in and need for information literacy are, to a large degree, possible because of the new technologies.

As classrooms move from a reliance on a single textbook to multiple sources in print and non-print formats, students are nudged away from finding the "right" answer (printed in a text), to finding the "best" answer from all available sources. The goal is not to find information, a sort of academic scavenger hunt, but to do something practical with it. "What is it I really want to know?" must be answered clearly before one can decide where to search among resources. Clarifying what is already known is helpful; so is recognizing that in this process, the question should change as information emerges. Information literacy can be achieved when schools are restructured around resource-based learning. Resource-based learning requires restructuring of the learning environment, the learning process, the role of the student, the role of the teacher, and the relationship between student and teacher.

The critical need has now become looking at what differences this telecommunications resource has made with the learners. Have students become information literate -- able to use information productively and creatively when facing new situations? Has the transfer of learning been successful -- are these students better prepared to be lifelong, independent learners? How do we provide learners with experiences that lead to greater information literacy? The availability of on-line resources should make teaching information literacy a priority in every classroom. However, these changes have happened so quickly that most individual teachers have not had time to review and evaluate the resources and develop meaningful lesson applications for the Internet. Many do not yet have the technical confidence even to attempt accessing resources on the World Wide Web.

To date, much of the work of making technology part of education has been focused on using the equipment, and teaching people how to manipulate computer languages, software, and hardware. Now the new "point and click" access to the World Wide Web through tools such as Netscape tools have made technology truly accessible as a learning tool for people of even limited technical ability. The focus now needs to shift to curriculum and critical evaluation of the on-line

information.

Performance Assessment. Tests and measurements represent a way of gathering information to make judgements. Judgements will be made with or without tests and measurements. Standards and testing are part of the current political and public dialogue. Sabers & Sabers say that "perhaps it matters less what standards are initially adopted ... than what adaptations are made during implementation (1996, p. 21). We are early in the process of discussing standards so adaptation must be the theme. Further, there are reservations about practice. Barak Rosenshine, in recent AERA Division C listserv discussions, noted that the instructional practices that are called constructivism today are hardly new. The same practices appeared in 1918 in Kilpatrick's Project Method, and reappeared in the 1970's as Open Education and Hands-On Science. He said he understood the passion that many have for these ideas, but did not see any new instructional developments here nor any convincing data. Reliability is a major problem. We all know the story of the essay that was sent to six readers and received grades
from F to A. That problem, he says, exists today with authentic assessment.

The Office of Technology Assessment defines performance assessment as "testing methods that require students to create and answer or product that demonstrates knowledge or skills" (cited in Improving American Schools Act Newsletter, 1996). Performance-based tasks, longer projects or experiments, as well as student portfolios will all be considered as assessment strategies. The emphasis is on tasks for real life solutions and communications. For education, a progression of strategies will be designed that are developmentally appropriate for grades K-12, including group based projects and individual tasks.

Being proactive in assessment puts a stronger case before the stakeholders than "oughts," "shoulds," and vague philosophical statements. Different, and emotionally potent, definitions of assessment make assessment discussions difficult. Testing has joined the forbidden topics of religion, sex, and politics for those who want harmony and nonconfrontational conversations. To reduce some of the risk in this paper, the kind of testing advocated is grounded in low inference measures. This category of assessment is limited to performance of tasks directly related to the skills being measured. Higher inference measures, such as intelligence tests, are of doubtful value at this stage of development of the construct.

Rationale

The computer has the capability of connecting our students to an incredibly dynamic library of resources with the potential to provide every classroom, whether in an isolated desert or a culturally diverse urban school, equal access to the richest wealth of knowledge available in history. However, this potential is yet unfulfilled. Schools may say they are building "technical skills" but in reality students have not developed the information literacy needed to manage the data glut or to make informed decisions using this new wealth of knowledge. Students need skills in accessing information, evaluating the accuracy and appropriateness of this information, and practice in applying the information to solve problems and to use appropriate technology to create real life presentations or useful products. Many of the computer resources currently in schools have not been used to support the real learning or the fundamental goals of education. Thornburg describes this as a profound paradigm shift from a teacher-centered classroom to the use of technology to create a learner-centered environment. If the emphasis on learning shifts to the learner and we agree there are political and pedagogical reasons to measure the degree of success, then the development of information literacy assessments is a given. This paper is a tentative proposal of a framework and process.

The First Step

The first step is to agree on a conceptual base. We suggest using the SCANS report (1992) because it has gained and maintained credibility with a wide variety of users. It offers a structure to sort out levels of skills in general and it can be applied to information literacy. As a reminder, the parts are basic skills, thinking skills, and personal qualities. An abbreviated sample in each category is listed below to ground the discussion.

1. Basic Skills
   - Reading: locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
   - Writing: communicates thoughts, ideas, information, and creates messages in writing; creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   - Arithmetic, Mathematics: performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
   - Listening: receives, attends to, interprets, and responds to verbal messages and other cues
   - Speaking: organizes ideas and communicates orally

2. Thinking Skills
- Creative Thinking: generates new ideas
- Decision Making: specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses the best alternative
- Problem solving: recognizes problems and devises and implements plan of action
- Visualizing: organizes, and processes symbols, pictures, graphs, objects, and other information
- Knowing How to Learn: uses efficient learning techniques to acquire and apply new knowledge and skills
- Reasoning: discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem

3. Personal Qualities
- Responsibility: exerts a high level of effort and preservers towards goal attainment.
- Self-Esteem: believes in own self-worth and maintains a positive view of self
- Sociability: demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
- Self-Management: assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
- Integrity/ Honesty: chooses ethical courses of action

Several of the generic SCANS Workplace Skills are closely related to information literacy. The obvious ones are:
- Identifies, organizes, plans, and allocates resources including time, money, material, facilities, and human resources
- Acquires and uses information including skills of evaluation, organization, maintenance, interpretation, communication, and computer use
- Understands complex social, organizational, and technological inter-relationships (systems) and works and operates effectively with them, monitors and corrects performance, and improves or designs them
- Works with a variety of technologies including their selection, application to tasks, and maintenance and troubleshooting.

Others are not part of the basic definition, such as "chooses ethical courses of action." But this concern is a major strand in our practice, especially related to privacy and copyright. Our argument is that the skills list is more a process of adaptation than creation.

Instruction is no longer one textbook expounded by the teacher, but a variety of resources from which students must extract needed information -- in short, resource-based learning. In resource-based learning, students select the resources they feel will best meet their needs for information. Their choices of materials may not differ from their teachers, but the focus has shifted to the students. Learning becomes an active, student-directed process. We agree with Haycock

(1991) that students must learn how to learn.

Current practice in assessment

> *Current testing practices in American education do not provide very powerful tools for assessing the effects of efforts to teach thinking and reasoning. Testing practices may in fact interfere with cultivation of the kind of higher order skills that are desired.* Resnick, Lauren B. (1987) Education and Learning to Think. National Academy Press. Washington, D.C.

The work of developing performance assessment measures will be hard in some ways. The same torture of ideas that occurs in the disciplines will creep into this effort. Resnick makes the point about testing in general. My experience with peers working in information literacy is that they are very student centered. At the same time, I see some use of information literacy as a new bottle to hold the sour wine of card catalog-type skills. If the larger professional concern is focused on what is best for the students, we have a chance of affecting practice in a positive way. If we let it drift, such measures that are developed may well interfere with the very skills we want to teach. Developing independent lifelong learners requires we develop effective evaluation measures for student information literacy performance. From this assessment we can learn how to enhance our knowledge of effective information literacy training and instruction and demonstrate to others the value of information literacy. The concession is made that the process sounds closer to vocational training than the Jeffersonian ideal of the educated citizen. However, these do not need to be mutually exclusive. The realities of successfully advocating assessments require close attention to widely accepted vocabulary and paradigms.

Assessment begins with the background each child brings to school and ends with competencies all high school graduates should possess. A baseline evaluation is made, followed by regular assessments of developmental progress. Performance-based tasks, longer projects or experiments, as well as student portfolios must be considered as assessment strategies. The emphasis, drawn from the SCANS foundation, will be on tasks for real life solutions and communications. A progression of strategies that are developmentally appropriate for grades K-12, including group based projects as well as individual tasks can be developed. The assessment strategy must specifically support national initiatives (SCANS Report, Improving America's

School Act, Goals 2000) by providing performance-based opportunities for all students. The final outcome is to ensure that graduating students are prepared to enter and function effectively in the workforce, make informed decisions in exercising citizenship, and pursue personal interests as lifelong learners.

A Proposal

The development of information literacy assessment will involve teachers, administrators, subject area experts, students, and key project staff, all under the guidance of the Assessment Coordinator. During Year One, teams from pilot schools assist in developing and testing initial assessment sample activities. In addition, regional trainers will be trained in anticipation of expansion. This "jump start" prepares trainers to assist regional site teams in using information literacy assessment measures. Starting the second year, new schools will be brought into the development process through professional training. The training materials will be refined and a larger pool of test items, procedures, and ideas will be available. This will support the development of norms and guidelines.

Students will offer important feedback on what is working from "inside the model." They will develop "portfolios" of their work throughout their involvement, including writing reflectively of their experiences. Student journal entries will be analyzed for ways to strengthen the learning experiences for all learners. Ongoing monitoring of these self-assessment portfolios will be used to refine the tool.

Teachers selected for the assessment team will engage in action research projects, looking more closely and reflectively at an aspect of class behaviors' and/or activities. They will be guided through this process by leadership teams who will have structured and non-structured discussions online. Members of leadership teams will spend time on reflective writing. Their insights will be captured and analyzed as they develop fluency with analysis and find practical applications of information literacy for classroom learning.

Through perhaps five years, development and testing will continue, but it is anticipated that the majority of the examples as well as the rubric(s) will be designed by the end of the third year, with additional examples and refinements the goals of in years four and five. This last phase will include the development of a professional development product with introductory multimedia,

guides, models, and assessment tools. The product will be available for national dissemination, with significant portions available online. The Colorado model developed by the Educational Media Association (1994) and available on-line, demonstrates the power of an online approach to development and dissemination.

Details of Developmental Process

The major steps in developing the performance assessment for information literacy are:

● Defining the Constructs to be Measured. Both the process and the products of student learning are to be included in this assessment. Preliminary steps will include developing sample tasks for each of the sites that promote information literacy in problem-solving or decision-making contexts; identifying strategies to analyze both the learning process and the final products; testing these through norming activities across the target development sites; determining what learning constructs to measure. All teachers involved with development and classroom testing will be trained to conduct action research projects in conjunction with the research and development of the information literacy assessment tool. This community of learners will add to our knowledge considerably as to barriers to and successful strategies for implementation.

● Defining the Target Population. In the first year, pilot sites will be selected. In subsequent years additional sites will be selected to work with developing and testing the tool(s), covering grades K-12 in wide and varied learning settings. Teachers from these sites will collaborate on developing and testing these assessment measures under the facilitation of the leadership teams and other experts as needed. Action research strategies will be employed to gain important insights from illuminating experiences, and group discussions online will extend the learning community throughout the project.

● Reviewing Related Tests. A growing body of performance assessments inform the development process, although the development of this information literacy measure will require innovation. There are several national associations actively working to develop projects integrating information literacy concepts with high content standards. Among these organizations are: the Association for School Curriculum and Development, the Coalition of Essential Schools, the Colorado Department of Education, and the California Dept of Education -- which plans to adopt assessment measures for its new performance standards in 1997.

● Developing a Prototype. During the first year, sample performance tasks and their assessment measures will be developed in English/Language Arts, History/Social Science, Mathematics, and Science. Through evaluating these first tasks, common features will be identified, barriers and successes can be analyzed, and a prototype will start to emerge. Throughout the project, activities will be sought that encourage learning by all students, and additional resources identified to ensure optional ways to gain competency in information literacy.

● Evaluating the Prototype. In the second year the prototype(s) will be developed and tested as a core of sites will have some experience in using on-line resources and information literacy for performance based learning. This prototype will be further tested and revised through Year 3 with a small (11) group of additional sites, and will be opened to further testing and refinements during Years 4 and 5.

● Revising the tool(s). From the start a very interactive, user -focused testing/revision process will be built into the project. Revision and retesting will be an ongoing, consistent part of each step of the process.

● Collecting Data on Test Validity and Reliability. Experts will conduct evaluations on the project and at each cycle evaluation reports will be circulated to professionals and decision makers. At this stage, actual achievement data on these assessments must be analyzed and evaluated to determine (1) the extent to which students are learning the outcomes and (2) the extent to which the curriculum and instruction is effective in facilitating this learning (Freedman, 1993).

Professional Development. The support of professionals in learning is critical to success. What passes for inservice training, and the name evokes memories that make the argument, is unlikely to bring about change. Early work on diffusion of innovations demonstrated specific strategies are associated with success. These strategies are described in the Rand Studies (Berman & McLaughlin, 1975; McLaughlin, 1990) and refined since., identify the important role of the adopter in adapting the innovation. These strategies work within the change process as a sequence of developmental learning. (Rogers, 1993). Full and collaborative participation is a primary determinate of successful dissemination and continuance.

Development and success of the training will be in the framework of a performance assessment matrix for information literacy. The strategy for development will be based on the ACOT (Dwyer,

1991) education five step change model. The steps with action added are:

1. Entry: Identify the volunteer teams, identify innovations to be incorporated into student learning;
2. Adoption: Teaching of the new strategies for telecommunications use, information literacy, and performance assessment through professional development;
3. Adaptation: Applying new knowledge and skills in specific local classroom;
4. Appropriation: Teachers and students develop their own materials on those principles and experiment;
5. Invention: Balanced use of teaching and project-based learning, integration of alternative modes of assessment and resource-based learning.

Teachers are the key to student attainment of information literacy. Active, student-centered learning represents a major shift in instructional strategies, a shift not often addressed in teacher preparation; therefore major staff development must be conducted. Teachers and administrators must become information literate themselves, comfortable with the variety of resources as well as with the process of accessing, evaluating, and using information. Furthermore, the assessments developed will need to be integrated into the process with the information literacy approach in students' final projects, portfolios, or performance measures. We know this process takes time, better measured in years than months, for a teacher to move from technical competence to integration of an innovation into classroom practice. (See Honey & Henriquez, 1993.) If credible assessment of information literacy skills is important, we must start now to have a significant place in the year 2020.

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